# Activity Goals, Science Topics, and Standards Correlations for Immersion Presents *Secrets of the Gulf*

The Immersion Presents *Secrets of the Gulf* Adventure Series consists of eight activities covering geology, history, coral biology, ecology, archaeology, the nature of science, technology, and careers. The hands-on activities are geared toward grades 5 to 8 and are written at a sixth grade level. All of the activities are correlated to the National Science Education Standards for grades 5 to 8 as well as the 2005 Ocean Literacy Essential Principles and Fundamental Concepts.

| Activity | Goals<br>*Participants will:* | Science Topics |
|---|---|---|
| 1: Rising to the Top | • learn about the origin and formation of salt domes in the Gulf of Mexico<br>• identify three common types of sedimentary rock found in the Gulf<br>• learn how petroleum is formed<br>• model the rise of a salt dome | rocks and minerals, sedimentary rock formation, petroleum formation, density |
| 2: Colorful Corals | • learn about basic coral anatomy<br>• make a model coral colony<br>• simulate how coral polyps eat | coral biology, structure and function |
| 3: Coral Construction | • learn about the history of coral reef formation at the Flower Garden Banks<br>• identify several conditions that must be present for hard corals to survive<br>• name the seven different biological zones at the Flower Garden Banks<br>• model the beginning of coral reef formation at the Flower Garden Banks | coral reef formation, biotic and abiotic factors |
| 4: It's All Connected | • learn how organisms can be classified according to how they get energy and what they eat<br>• identify some of the organisms that live at the Flower Garden Banks<br>• construct a Flower Garden Banks food web | food chains, food webs |
| 5: Manta Mysteries | • learn how photographs help researchers identify manta rays<br>• describe how acoustic tagging is being used to investigate manta ray movement patterns at the Flower Garden Banks<br>• play a game to simulate the identification of manta rays in the field | manta ray biology, photo identification, acoustic tagging, nature of science |
| 6: Journey to the Deep Seep | • learn about the brine seep features at the East Flower Garden Bank<br>• define *density* and identify how it relates to the brine seep features<br>• make a model of a brine lake | underwater seeps, density, biotic and abiotic factors |
| 7: Undersea Archaeology | • identify some of the unanswered questions in American archaeology<br>• describe the archaeology component of the Secrets of the Gulf expedition<br>• build and bury an ancient shoreline<br>• model the use of a sub-bottom profiler to locate and map a buried shoreline | marine archaeology, sea level changes, technologies used in ocean exploration |
| 8: All Aboard! | • learn about the vehicles used in the Secrets of the Gulf expedition<br>• describe the science goals of the expedition<br>• play a game to learn more about the qualifications and roles of some of the people who participated in the expedition | careers, archaeology, biology, geology, technologies used in ocean exploration |

| Activity | Correlations to National Science Education Standards (Grades 5–8)* | Correlations to Ocean Literacy Essential Principles and Fundamental Concepts** |
|---|---|---|
| 1: Rising to the Top | *Standard D: Earth and Space Science*<br>• Structure of the Earth system<br>• Earth's history | *Essential Principle 2: Ocean Shapes the Features of Earth*<br>a: Earth materials and geochemical cycles that originate in the ocean<br>b: Sea level changes over time |
| 2: Colorful Corals | *Standard C: Life Science*<br>• Structure and function in living systems<br>• Populations and ecosystems<br>*Standard D: Earth and Space Science*<br>• Structure of the Earth system | *Essential Principle 2: Ocean Shapes the Features of Earth*<br>a: Earth materials and geochemical cycles that originate in the ocean<br>*Essential Principle 5: Diversity of Life in the Ocean*<br>d: Life cycles, adaptations, and relationships among ocean organisms |
| 3: Coral Construction | *Standard C: Life Science*<br>• Populations and ecosystems<br>• Diversity and adaptations of organisms<br>*Standard D: Earth and Space Science*<br>• Structure of the Earth system | *Essential Principle 2: Ocean Shapes the Features of Earth*<br>a: Earth materials and geochemical cycles that originate in the ocean<br>b: Sea level changes over time<br>*Essential Principle 5: Diversity of Life in the Ocean*<br>d: Life cycles, adaptations, and relationships among ocean organisms<br>e: Diverse ocean habitats from the surface to the sea floor<br>f: Influence of environmental factors on ocean life<br>*Essential Principle 7: Ocean Exploration*<br>d: Technologies, sensors, and tools used in ocean exploration |
| 4: It's All Connected | *Standard C: Life Science*<br>• Populations and ecosystems | *Essential Principle 5: Diversity of Life in the Ocean*<br>a: Huge range in size of living things in ocean<br>d: Life cycles, adaptations, and relationships among ocean organisms |
| 5: Manta Mysteries | *Standard A: Science as Inquiry*<br>• Abilities necessary to do scientific inquiry<br>• Understandings about scientific inquiry<br>*Standard C: Life Science*<br>• Populations and ecosystems<br>*Standard E: Science and Technology*<br>• Understandings about science and technology<br>*Standard F: Science in Personal and Social Perspectives*<br>• Science and technology in society<br>*Standard G: History and Nature of Science*<br>• Science as a human endeavor<br>• Nature of science | *Essential Principle 5: Diversity of Life in the Ocean*<br>a: Huge range in size of living things in ocean<br>d: Life cycles, adaptations, and relationships among ocean organisms<br>*Essential Principle 7: Ocean Exploration*<br>b: Exploration, inquiry, and study of ocean systems and processes<br>d: Technologies, sensors, and tools used in ocean exploration |
| 6: Journey to the Deep Seep | *Standard A: Science as Inquiry*<br>• Understandings about scientific inquiry<br>*Standard B: Physical Science*<br>• Properties and changes of properties in matter<br>*Standard C: Life Science*<br>• Populations and ecosystems<br>*Standard D: Earth and Space Science*<br>• Structure of the Earth system | *Essential Principle 1: Ocean Features*<br>e: Properties of salt water<br>*Essential Principle 2: Ocean Shapes the Features of Earth*<br>a: Earth materials and geochemical cycles that originate in the ocean<br>*Essential Principle 5: Diversity of Life in the Ocean*<br>d: Life cycles, adaptations, and relationships among ocean organisms<br>f: Influence of environmental factors on ocean life<br>*Essential Principle 7: Ocean Exploration*<br>b: Exploration, inquiry, and study of ocean systems and processes<br>d: Technologies, sensors, and tools used in ocean exploration |
| 7: Undersea Archaeology | *Standard A: Science as Inquiry*<br>• Abilities necessary to do scientific inquiry<br>• Understandings about scientific inquiry<br>*Standard D: Earth and Space Science*<br>• Structure of the Earth system<br>*Standard E: Science and Technology*<br>• Understandings about science and technology<br>*Standard G: History and Nature of Science*<br>• Nature of science | *Essential Principle 2: Ocean Shapes the Features of Earth*<br>b: Sea level changes over time<br>*Essential Principle 6: Connections Between the Ocean and Humans*<br>b: Food, energy, mineral, and transportation resources from the ocean<br>*Essential Principle 7: Ocean Exploration*<br>a: The ocean as the last and largest unexplored place on Earth<br>d: Technologies, sensors, and tools used in ocean exploration |
| 8: All Aboard! | *Standard A: Science as Inquiry*<br>• Understandings about scientific inquiry<br>*Standard E: Science and Technology*<br>• Understandings about science and technology<br>*Standard F: Science in Personal and Social Perspectives*<br>• Science and technology in society<br>*Standard G: History and Nature of Science*<br>• Science as a human endeavor<br>• Nature of science | *Essential Principle 7: Ocean Exploration*<br>b: Exploration, inquiry, and study of ocean systems and processes<br>d: Technologies, sensors, and tools used in ocean exploration<br>f: Interdisciplinary nature of ocean exploration |

** For a complete listing of the National Science Education Standards (Grades 5–8), visit www.nap.edu/readingroom/books/nses/html/6d.html.*

*** Ocean Literacy Essential Principles and Fundamental Concepts are paraphrased for brevity. For a complete listing of the principles and concepts, visit www.coexploration.org/oceanliteracy.*